Columbia University in the City of New York | *New York, N. Y. 10027*

SCHOOL OF ENGINEERING & APPLIED SCIENCE

PLASMA LABORATORY

SEELEY W. MUDD BUILDING

5 February 1965

Office of Grants and Research Contracts
Code SC
National Aeronautics and Space Administration
Washington 25, D. C.

Re: NsG–302–63

Supplement 1

Gentlemen:

This is the third semi–annual report on the research grant NsG–302–63 (and the first report on supplement 1) entitled, "Theoretical Research Investigations in Plasma Physics and Magnetogasdynamics."

Alfvén Waves (C. K. Chu)

Work was initiated and is well on the way toward completion in the study of Alfvén discontinuities. It has already been found that: (1) a propagating plane Alfvén discontinuity never possesses steady structure, but its thickness must grow as the square root of time; (2) Alfvén discontinuities exist also in incompressible conducting fluids under steady flow conditions and hence may be observable under laboratory conditions. The structure of such steady Alfvén discontinuities is still being investigated. In view of the current interest on possible Alfvén waves generated by space satellites (e.g. work by Foley and Ruderman) a more complete understanding of Alfvén discontinuities seems desirable and relevant at this time. Dr. Chu's work is being done jointly with Dr. D. L. Turcotte of Cornell University.

Optically Thin Radiative Shocks (P. Koch)

An approximate method has been developed and used to find the maximum temperature behind an unsteady optically thin radiative shock. It was assumed that a semi–steady-state exists, in which a fluid particle, as it is heated

During this last report period we forwarded to NASA reprints of the work by Dr. Sen entitled "The Effect of Compressibility on Kelvin-Helmholtz Instability in a Plasma", which was published in The Physics of Fluids.

Respectfully submitted by

Robert A. Gross
Professor of
Engineering Science

RAG/ec

cc: Dr. Warren F. Goodell, Jr.
      Dr. Robert Jastrow
      Dr. C. K. Chu
      Dr. Paul Koch
      Professor A. K. Sen